AMENDMENTS TO THE CLAIMS

The listing of claims below replace all prior versions, and listings, of claims:

1. (Cancelled)

2. (Cancelled)

3. (Currently Amended) ~~The apparatus of claim 2, further comprising~~ Apparatus for sensing one or more physical parameters at a remote location, comprising:

a first tubing containing a communication cable and a sensor in communication therewith, the sensor being located within the tubing proximate the remote location;

a second tubing having a first end in fluid communication with the first tubing proximate the sensor, and a second end;

a reservoir containing a barrier fluid, the reservoir having a first opening in fluid communication with the second end of the second tubing, and a second opening in fluid communication with the remote location; and

a first flow control element disposed within the second tubing between the first tubing and the ~~fluid barrier~~ reservoir, the first flow control element configured to be actuated between a first state allowing fluid flow in the second tubing in any direction, and a second state restricting fluid flow in the second tubing from the ~~barrier fluid~~ reservoir to the first tubing.

4. (Original) The apparatus of claim 3 further comprising a second flow control element disposed within the first tubing, the second flow control element configured to be actuated between a first state allowing fluid flow in the first tubing in any direction, and a second state restricting fluid flow from the first tubing.

5 (Currently Amended) ~~The apparatus of claim 2 further comprising~~ Apparatus for sensing one or more physical parameters at a remote location, comprising:

a first tubing containing a communication cable and a sensor in communication therewith, the sensor being located within the tubing proximate the remote location;

a second tubing having a first end in fluid communication with the first tubing proximate the sensor, and a second end;

a reservoir containing a barrier fluid, the reservoir having a first opening in fluid communication with the second end of the second tubing, and a second opening in fluid communication with the remote location; and

a gel plug disposed within the second tubing between the first tubing and the ~~barrier fluid~~ reservoir, the gel plug comprising a volume containing a gel selected to chemically isolate the barrier fluid from fluids within the first tubing.

6. (Currently Amended) The apparatus of claim 5 further comprising a third tubing having a first end in fluid communication with the ~~barrier fluid~~ reservoir, and a second end in fluid communication with the remote location, and further comprising a fluid actuated control valve disposed within the third tubing, the fluid actuated control valve being responsive to open when fluid is pumped through the first, second and third tubings.

7. (Currently Amended) ~~The apparatus of claim 2 further comprising~~ Apparatus for sensing one or more physical parameters at a remote location, comprising:

a first tubing containing a communication cable and a sensor in communication therewith, the sensor being located within the tubing proximate the remote location;

a second tubing having a first end in fluid communication with the first tubing proximate the sensor, and a second end;

a reservoir containing a barrier fluid, the reservoir having a first opening in fluid communication with the second end of the second tubing, and a second opening in fluid communication with the remote location; and

a fluid motive apparatus for passing fluid into the first and second tubings, and a fluid volume measuring device configured to measure the volume of fluid passed into the first and second tubings by the fluid motive apparatus.

8. (Currently Amended) Apparatus for sensing one or more physical parameters at remote locations, comprising:

a first tubing containing a communication cable and a plurality of sensors in communication therewith, each said sensor being located within the tubing proximate a respective remote location; and

a plurality of fluid barrier sensing sections, each said fluid barrier sensing section comprising:

a second tubing having a first end in fluid communication with the first tubing proximate one of the sensors, and a second end; and

a ~~fluid barrier~~ reservoir containing a barrier fluid, the ~~fluid barrier~~ reservoir having a first opening in fluid communication with the second end of the associated second tubing, and a second opening in fluid communication with the associated remote location.

9. (Cancelled)

10. (Currently Amended) A fluid barrier for isolating a sensor contained within a tubing from an environment at a location proximate the sensor, comprising:

a fluid conduit having a first end in fluid communication with the tubing proximate the sensor, and a second end;

a first ~~fluid barrier~~ reservoir having a first opening in fluid communication with the remote location, and a second opening in fluid communication with the second end

of the fluid conduit, the first opening being distal from the second opening, the first ~~fluid barrier~~ reservoir containing a first fluid having a first specific gravity; and

a second ~~fluid barrier~~ reservoir disposed within the fluid conduit between the first ~~fluid barrier~~ reservoir and the tubing, the second ~~fluid~~ reservoir having first and second openings for connecting to the fluid conduit, the first opening of the second ~~fluid barrier~~ reservoir being distal from the second opening of the second ~~fluid barrier~~ reservoir, the second ~~fluid barrier~~ reservoir containing a second fluid having a second specific gravity different than the first specific gravity.

11. (Currently Amended) The fluid barrier of claim 10 wherein the second ~~fluid barrier~~ reservoir is located elevationally higher than the first ~~fluid barrier~~ reservoir, and further wherein the first specific gravity is greater than the second specific gravity.

12. (Currently Amended) The fluid barrier of claim 11 further comprising a fluid actuated control valve disposed within the fluid conduit between the second ~~fluid barrier~~ reservoir and the tubing, the fluid actuated control valve being responsive to open when fluid is pumped through the fluid conduit towards the second and first ~~fluid barrier~~ reservoirs.

13. (Original) The fluid barrier of claim 10 wherein the first and second fluids are essentially immiscible with one another, and further wherein the first fluid is selected to be essentially chemically inert with an environment at the remote location.

14. (Cancelled)

15. (Cancelled)

16. (Original) Method for chemically isolating a sensor from a location at which a parameter is to be measured by the sensor, the location being in a fluid environment, comprising:

emplacing within a tube a sensor in signal communication with a communication cable, the sensor being located within a section of the tube proximate the location at which the parameter is to be measured;

placing in fluid communication with the section of the tube containing the sensor a fluid reservoir, the fluid reservoir further being placed in fluid communication with the fluid environment;

isolating the tube to prevent passage of fluid out of the tube; and

passing a first fluid into the tube to cause the fluid to flow into the fluid reservoir.

17. (Original) The method of claim 16 further comprising measuring the volume of the first fluid passed down the tube and into the fluid reservoir, and ceasing flowing the first fluid into the tube when a sufficient volume of the first fluid has been passed down the tube to fill at least a portion of the fluid reservoir.

18. (Previously Presented) The method of claim 17 further comprising placing in flow-through fluid communication with the section of the tube containing the sensor and the fluid reservoir a second fluid reservoir, and passing a second fluid into the tube to cause the second fluid to flow into the second fluid reservoir.

19. (Currently Amended) Apparatus for protecting at least a sensor ~~sensors~~ and a fiber optic cable ~~cables~~ surrounded by fluids which are inert with respect to the sensor ~~sensors~~ and ~~optical~~ fiber optic cable ~~cables~~ located in a sensor highway which includes a fluid reservoir containing one or more barrier fluids, which reservoir is connected on one side of the one or more barrier fluids to the sensor highway and on the other side of the one or more barrier fluids is connected to a hydrocarbon reservoir fluid, wherein the one or more barrier fluids in the fluid reservoir form a barrier against the ingress of molecules from the hydrocarbon reservoir fluid to the sensor highway side of the fluid reservoir where the sensor ~~sensors~~ and ~~optical~~ fiber optic cable are located,

wherein the sensor highway comprises a conduit through which the sensor ~~sensors~~ and ~~optical~~ fiber optic cable ~~cables~~ are adapted to be moved from one location to another location.

20. (Cancelled)

21. (Currently Amended) ~~The apparatus of claim 2~~ Apparatus for sensing one or more physical parameters at a remote location, comprising:

a first tubing containing a communication cable and a sensor in communication therewith, the sensor being located within the tubing proximate the remote location;

a second tubing having a first end in fluid communication with the first tubing proximate the sensor, and a second end; and

a reservoir containing a barrier fluid, the reservoir having a first opening in fluid communication with the second end of the second tubing, and a second opening in fluid communication with the remote location,

wherein the cable and sensor are adapted to be moved from a first location to a second location through the first tubing.

22. (Previously Presented) The apparatus of claim 21, wherein the cable and sensor are adapted to be moved by fluid flow in the first tubing.

23. (Previously Presented) The apparatus of claim 21, further comprising a highway extending a length of a wellbore, the highway comprising the first tubing.

24. (Currently Amended) The apparatus of claim ~~2~~ 21, wherein the cable and sensor are adapted to be moved from a well surface to the remote location in a well through the first tubing.

25. (Currently Amended) ~~The apparatus of claim 2~~ Apparatus for sensing one or more physical parameters at a remote location, comprising:

a first tubing containing a communication cable and a sensor in communication therewith, the sensor being located within the tubing proximate the remote location;

a second tubing having a first end in fluid communication with the first tubing proximate the sensor, and a second end; and

a reservoir containing a barrier fluid, the reservoir having a first opening in fluid communication with the second end of the second tubing, and a second opening in fluid communication with the remote location,

wherein the sensor comprises an optical fiber sensor.

26. (Previously Presented) The apparatus of claim 25, wherein the cable comprises an optical fiber cable.

27. (Currently Amended) The apparatus of claim 19, wherein the sensor ~~sensors~~ and ~~optical cables~~ fiber optical cable are adapted to be moved through the sensor highway by fluid flow in the sensor highway.

28. (Previously Presented) The apparatus of claim 27, wherein the sensor highway comprises a conduit adapted to extend a length along a wellbore.

29. (Previously Presented) The apparatus of claim 19, wherein the sensor highway has a first section adapted to extend from a well surface to a remote location in a well, and a second section adapted to extend from the remote location back to the well surface.

30. (Previously Presented) Apparatus for sensing one or more physical parameters at a remote location in a well, comprising:

a conduit containing a communication cable and a sensor coupled to the cable, the cable and sensor adapted to be deployed through the conduit from a first location to a second location; and

a barrier fluid assembly containing a first barrier fluid, the first barrier fluid adapted to isolate well fluids from fluid in the conduit.

31. (Previously Presented) The apparatus of claim 30, wherein the cable comprises an optical fiber cable.

32. (Previously Presented) The apparatus of claim 30, wherein the barrier fluid assembly contains a second barrier fluid that is non-miscible with the first barrier fluid.

33. (Previously Presented) The apparatus of claim 32, wherein the first and second barrier fluids have different densities.

34. (Previously Presented) The apparatus of claim 32, wherein the barrier fluid assembly comprises two reservoirs, one containing the first barrier fluid and one containing the second barrier fluid.

35. (Previously Presented) The apparatus of claim 30, wherein the first barrier fluid comprises liquid metal.

36. (Currently Amended) The apparatus of claim 30, wherein the barrier fluid assembly comprises a reservoir containing the first barrier fluid, the reservoir having an opening to receive well fluids, the barrier fluid assembly further comprising a piston in the reservoir to separate the well fluids and the first barrier fluid, the piston to communicate pressure of the well to the ~~first~~ conduit.

37. (Previously Presented) The apparatus of claim 36, wherein the piston comprises a bore extending through the piston to enable fluid contact between the first barrier fluid and the well fluids.

38. (Previously Presented) The apparatus of claim 30, wherein the cable and sensor are adapted to be deployed through the conduit by fluid flow in the conduit.

39. (Currently Amended) A method of sensing one or more physical parameters at a remote location in a well, comprising:

deploying a cable and sensor through a conduit extending into the well, wherein deploying the cable and sensor comprises deploying the cable and sensor from a first location to a second location in the conduit;

providing a barrier fluid assembly containing a barrier fluid; and

isolating well fluids from fluid in the conduit with the barrier fluid.

40. (Previously Presented) The method of claim 39, wherein deploying the cable and sensor comprises deploying the cable and sensor through the conduit using fluid flow in the conduit.

41. (New) The apparatus of claim 3, wherein the first flow control element is adapted to be actuated by a signal.